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jc877 U.S. PTO
07/12/00

NEW, CONTINUATION, DIVISIONAL OR
CONTINUATION-IN-PART APPLICATION
UNDER 37 C.F.R. §1.53(b)

Attorney Docket No. 0275A0103COF
Express Mail Label No. EL 581 386 841 US
Date July 12, 2000

jc658 U.S. PTO
09/614355
07/12/00

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Hon. Commissioner of Patents and Trademarks
Washington, D. C. 20231

Sir:

Transmitted herewith for filing under 37 C.F.R §1.53(b) is a patent application for **ADJUSTABLE FENCE FOR COMPOUND MITER SAW**

identified by: ☐ First named inventor _____
or ☒ Attorney Docket No. (see above)

1. Type of Application

☐ This application is a new (non-continuing) application.

☒ This application is a continuation of prior application Serial No. 09/163,896 filed October 1, 1998, which is a continuation of U.S. application Serial No. 08/600,907 filed February 13, 1996, which is a continuation of U.S. application Serial No. 08/329,766 filed October 27, 1994 (now abandoned), which is a continuation of U.S. application Serial No. 08/088,266 filed July 7, 1993 (now abandoned), which is a continuation of U.S. application Serial No. 07/774,767 filed October 9, 1991 (now abandoned), and a continuation-in-part of U.S. application Serial No. 07/774,022 filed October 9, 1991, now U.S. Patent No. 5,297,463, issued March 29, 1994. Amend the specification by inserting before the first line the sentence:

--This is a continuation of United States patent application Serial No. 09/163,896 filed October 1, 1998, which is a continuation of United States application Serial No. 08/600,907 filed February 13, 1996, which is a continuation of United States application Serial No. 08/329,766 filed October 27, 1994 (now abandoned), which is a continuation of United States application Serial No. 08/088,266 filed July 7, 1993 (now abandoned), which is a continuation of United States application Serial No. 07/774,767 filed October 9, 1991 (now abandoned), and a continuation-in-part of United States application Serial No. 07/774,022 filed October 9, 1991, now U.S. Patent No. 5,297,463, issued March 29, 1994.--

☒ The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied, is considered part of the disclosure of the accompanying application and is hereby incorporated by reference therein.

If for some reason applicant has not requested a sufficient extension of time in the parent application, and/or has not paid a sufficient fee for any necessary response in the parent application and/or for the extension of time necessary to prevent the abandonment of the parent application prior to the filing of this application, please consider this as a Request for an Extension for the required time period and/or authorization to charge Deposit Account No. 02-2548 for any fee that may be due. THIS FORM IS BEING FILED IN TRIPLICATE: one copy for this application; one copy for use in connection with the Deposit Account (if applicable); and one copy for the above-mentioned parent application (if any extension of time is necessary).

Attorney Docket No. 0275A0103COFExpress Mail Label No. EL 581 386 841 USDate July 12, 2000**Contents of Application**

- a. ☒ Specification of 19 pages
 ☐ A microfiche computer program (Appendix)
 ☐ A nucleotide and/or amino acid sequence submission
- ☐ Because the enclosed application is in a non-English language, a verified English translation ☐ is enclosed ☐ will be filed.
- ☐ Cancel original claims ____ of the prior application before calculating the filing fee. (At least one original independent claim must be retained for filing date purposes.)
- b. ☒ Drawings on 5 sheets
- c. ☒ A signed Oath/Declaration

The enclosed Oath/Declaration is a copy from a prior application under 37 C.F.R. §1.63(d).

d. Fees

FILING FEE	Number		Number		Basic Fee	
CALCULATION	Filed		Extra		Rate	\$690.00
Total Claims	26	- 20 =	6	×	\$18.00 =	108.00
Independent Claims	2	- 3 =	0	×	\$78.00 =	0.00
Multiple Dependent Claim(s) Used					\$260.00 =	
FILING FEE - NON-SMALL ENTITY						798.00
FILING FEE - SMALL ENTITY: Reduction by 1/2						
<input type="checkbox"/> Verified Statement under 37 C.F.R. §1.27 is enclosed.						
<input type="checkbox"/> Verified Statement filed in prior application.						
Assignment Recordal Fee (\$40.00)						
37 C.F.R. §1.17(k) Fee (non-English application)						
TOTAL						798.00

- ☐ A check is enclosed to cover the calculated fees. The Commissioner is hereby authorized to charge any additional fees that may be required, or credit any overpayment, to Deposit Account No. 02-2548. A duplicate copy of this document is enclosed.
- ☐ The calculated fees will be paid within the time allotted for completion of the filing requirements.
- ☒ The calculated fees are to be charged to Deposit Account No. 02-2548. The Commissioner is hereby authorized to charge any additional fees that may be required, or credit any overpayment, to said Deposit Account. A duplicate copy of this document is enclosed.

Attorney Docket No. 0275A0103COF

Express Mail Label No. EL 581 386 841 US

Date July 12, 2000

3. Priority Information

- ☐ **Foreign Priority:** Priority based on _____ Application No. _____, filed _____, is claimed.
- ☐ A copy of the above referenced priority document ☐ is enclosed / ☐ will be filed in due course, pursuant to 35 U.S.C. §119(a)-(d).
- ☐ **Provisional Application Priority:** Priority based on United States Provisional Application No. _____, filed _____, is claimed under 35 U.S.C. §119(e).

4. Other Submissions

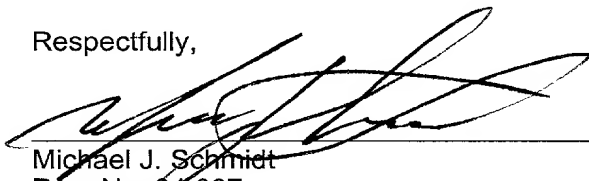
- ☒ A Preliminary Amendment is enclosed.
- ☐ An Information Disclosure Statement, _____ sheets of PTO Form 1449, and _____ patent(s)/publications/documents are enclosed.
- ☒ A power of attorney
- ☐ is submitted ☐ with the new Oath/Declaration.
- ☒ is of record in the prior application and a copy is enclosed.
- ☒ An Assignment of the invention
- ☐ is enclosed with a cover sheet pursuant to 37 C.F.R. §§3.11, 3.28 and 3.31.
- ☒ is of record in a prior application. The assignment is to Black & Decker, Inc., and is recorded at Reel 6743, Frame(s) 687.
- ☐ An Establishment of Assignee's Right To Prosecute Application Under 37 C.F.R. §3.73(b), and Power Of Attorney is enclosed.
- ☒ An Express Mailing Certificate is enclosed.
- ☐ Other: _____

Attention is directed to the fact that the correspondence address for this application is:

Harness, Dickey & Pierce, P.L.C.
P.O. Box 828
Bloomfield Hills, Michigan 48303
(248) 641-1600.

Respectfully,

Date July 12, 2000
Harness, Dickey & Pierce, P.L.C.
P.O. Box 828
Bloomfield Hills, Michigan 48303
(248) 641-1600


Michael J. Schmidt
Reg. No. 34,007

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Date: July 12, 2000

Hon. Commissioner of Patents
and Trademarks
Washington, D.C. 20231

Sir:

EXPRESS MAILING CERTIFICATE

Applicants: Phillip Miller, Daryl S. Meredith and Michael L. O'Banion

Serial No. (if any):

For: **ADJUSTABLE FENCE FOR COMPOUND MITER SAW**

Docket: 0275A0103COF

Attorney: Michael J. Schmidt

"Express Mail" Mailing Label Number **EL 581 386 841 US**

Date of Deposit **July 12, 2000**

I hereby certify and verify that this Express Mail Certificate (label no. **EL 581 386 841 US**), Request to file a continuation application under 37 C.F.R. § 1.53(b) (in triplicate), 19 pgs. patent application with 5 pgs. formal drawings showing FIGS. 1-10, copy of executed Declaration and Power of Attorney and Assignment from prior application, Preliminary Amendment and postcard are being deposited with the United States Postal Service "Express Mail Post Office To Addressee" service under 37 C.F.R. 1.10 on the date indicated above and is addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231.


Debra J. Coughlin

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Art Unit:)
Examiner:)
Inventor: Phillip Miller et al.)
Serial No:)
Filed: July 12, 2000)
For: **Adjustable Fence for Compound**)
Miter Saw)
Attorney Docket: 0275A0103COF)

**PRELIMINARY
AMENDMENT**

EXPRESS MAILING CERTIFICATE

I hereby certify that this letter and the response attached hereto are being deposited with the United States Postal Service as Express Mail in an envelope addressed to Commissioner of Patents and Trademarks, Washington, D.C. 20231, on

July 12, 2000
BY 

Hon. Commissioner of Patents and Trademarks
Washington, D.C. 20231

Dear Sir:

Preliminary to examination of the above-identified application on its merits, please amend the application as follows:

IN THE CLAIMS

Please add new Claims 22-26 as follows:

22. (New) A miter saw having a base and a saw blade selectively movable to any of a number of selected cutting positions comprising:

a table disposed between said base and said saw blade, said table being rotatably supported by said base, said table and said base defining a first planar workpiece supporting surface;

an adjustable, laterally-extending, workpiece-supporting fence assembly, said fence assembly including a first fixed fence fixedly interconnected with the base and disposed on one side of the saw blade, and a movable fence selectively laterally movable and interconnected with the base and disposed on said one side of said saw blade, said first fixed fence defining a second planar workpiece supporting surface which extends a first distance from said first planar workpiece supporting surface and said movable fence defining a third planar workpiece supporting surface which extends a second distance from said first fixed fence, said first fixed fence and said movable fence being located on said one side of said saw blade, said second distance being greater than said first distance.

23. (New) A compound miter saw according to Claim 22, further comprising a second fixed fence portion fixedly interconnected with the base and disposed on an opposite side of the saw blade, said second fixed fence portion further defining said planar workpiece-supporting surface.

24. (New) A compound miter saw according to Claim 23, wherein, said second fixed fence portion is integral with said first fixed fence portion.

25. (New) A compound miter saw according to Claim 22, further comprising a fixed clamping means fixedly interconnected to said base for selectively and clampingly securing said movable fence portion to the base.

26. (New) A compound miter saw according to Claim 22, further comprising a fixed clamping means fixedly interconnected to said base for selectively and clampingly securing said movable fence portion to the base, and a movable clamping means fixedly interconnected with said movable fence portion for selectively and clampingly securing said movable fence portion to the base.

REMARKS

Claims 1-26 remain pending in the present application. Claims 22-26 are new. Basis for the amendments can be found throughout the specification, claims and drawings as originally filed.

New Claims

New Claims 22-26 are similar to the claims 48-52 that are pending in Applicant's reissue application Serial No. 08/619,394. The pending claims 48-25 of that application have been amended to overcome the 35 U.S.C. § 112 rejections. Because this application claims priority back to the patent for which reissue is being sought, Applicant has decided to include them in this application rather than continue with the reissue.

Regarding the rejection under 35 U.S.C. § 102 and 103, these claims were rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Viazanko. The Examiner has stated that Viazanko discloses a saw with every structural limitation of the claimed invention including a base; a saw blade; a table; and an adjustable fence assembly including a first fixed fence portion; a movable fence portion and a second fixed fence portion integral with the first fixed fence portion, wherein the claimed second distance is greater than the claimed first distance (it is shown to be slightly greater in Figure 2).

Applicant respectfully disagrees with the Examiner. While the total height of the movable fence is shown slightly larger than the fixed fence, the claim defines the planar workpiece supporting surface as being larger, and in Viazanko, the planar workpiece supporting surface of the movable fence is clearly shorter than the fixed fence. The Examiner then states that if the applicant makes this argument it is the Examiner's position that it would be obvious since Applicant has not stated that having these fence portions at specific relative heights is for any particular purpose. Applicant respectfully disagrees with the Examiner on this point also. In the last amendment filed in the reissue application, Applicant explained how this feature (the relative specific heights) allows for the adjustment of the fence during mixer and bevel cuts

while still providing the largest amount of support for the workpiece. As shown in Figure 6, when the saw is positioned for bevel cuts, the fixed fence needs to be short to allow for the angulation of the cutting blade. While the fixed fence could be increased in height, this would reduce the amount of support available during a miter cut as shown in Figure 5. Because of the relative heights of the fixed and movable fences, adequate support is provided for both miter and bevel cuts. The need for this height relationship is not an issue in Viazanko since Viazanko is not trying to solve the same problem as is the present invention. Since Viazanko does not adjust for bevel cuts and only adjusts for miter cuts, the problem addressed by the present invention is not recognized by Viazanko.

In the case of In re Horn, 203 U.S.P.Q. 969 (C.C.P.A. 1979), Judge Watson clearly articulated the well-known standard for combining references under 35 U.S.C. § 103. Judge Watson stated that: "... there must be some basis for concluding that the reference would be considered by one skilled in the particular art working on the pertinent problem to which the invention pertains." 203 U.S.P.Q. at 971 (emphasis added). Thus, when looking to solve the problem associated with bevel and miter cuts, one skilled in the art would not consider a reference which shows only miter cutting because it does not have the same problems to overcome.

The Examiner further takes official notice that it is old and well known in the art to provide fences of various heights for various reasons. Certainly, if this is as old and well known as believed by the Examiner, it should not be difficult for the Examiner to identify at least one reference which at least illustrates a compound miter saw having a fence with the defined proportions. Absent the identification of at least one reference disclosing this old and well known feature, Applicant respectfully requests the Examiner to withdraw the rejection.

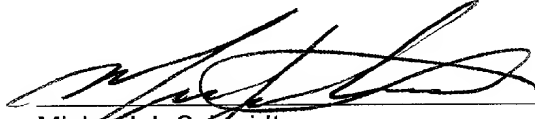
In light of the above amendments and remarks, Applicant would submit that all Claims are in a condition for allowance and thus Applicant requests that the Examiner pass the case to issue at his earliest possible convenience.

Should the Examiner have any questions regarding the present amendment he should not hesitate to contact the undersigned at (248) 641-1600.

Respectfully submitted,

HARNESS, DICKEY & PIERCE, P.L.C.

July 10, 2000
Date



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Attorney Docket No. 0275A0103COF

ADJUSTABLE FENCE FOR COMPOUND MITER SAW

Cross Reference to Related Applications

This application is a continuation of U.S. application Serial No. 09/163,896 filed
5 October 1, 1998, which is a continuation of U.S. application Serial No. 08/600,907 filed
February 13, 1996, which is a continuation of U.S. application Serial No. 08/329,766
filed October 27, 1994 (now abandoned), which is a continuation of U.S. application
Serial No. 08/088,266 filed July 7, 1993 (now abandoned), which is a continuation of
U.S. application Serial No. 07/774,767 filed October 9, 1991 (now abandoned), and a
10 continuation-in-part of U.S. application Serial No. 07/774,022 filed October 9, 1991, now
U.S. Patent No. 5,297,463, issued March 29, 1994.

Background and Summary of the Invention

The present invention relates generally to compound miter saws, or other power
15 operated equipment or machinery. More particularly, the invention relates to
improvements in an adjustable fence for such power-operated equipment, with the
fence assembly having a fixed fence portion and a movable fence portion for selectively
adjusting the gap between the fixed and movable fence portions in order to allow
sufficient clearance for performing various operations on a workpiece when the
20 equipment is in any of a number of different cutting or working modes.

Saws and other apparatuses designed for cutting or performing other working
operations on a workpiece typically require a workpiece-supporting fence assembly in
order to support and locate the workpiece in a proper fixed position for performing the
working operation. Examples of such equipment include compound miter saws, which
25 are adapted for allowing the user to selectively move the saw blade into any of a

number or positions or modes for square cutting, miter cutting, bevel cutting, or compound cutting where a combination miter and bevel are cut. In addition, some operations, such as dado cutting or shaping operations, for example, require the use of saw blades or other cutting or working devices of different shapes or sizes to be substituted for one another in order to perform the desired operation on the workpiece, whether the workpiece is composed of wood, plastic, metal, or other materials.

In order to accommodate these widely varied working operations, the workpiece-supporting fence is frequently required to be at least partially adjustable in order to selectively vary the gap or space between a fixed and a movable portion of the workpiece-supporting fence, thus selectively providing clearance for the saw blade, cutter, or other device performing the working operation on the workpiece. If such adjustability were not provided, a relatively large permanent gap would have to be provided between portions of the fence in order to accommodate the widely varying range of movement, position, or size of the saw blade, cutter, or other working device. Thus, in order to provide adequate workpiece support when performing operations that do not require such large clearance, the above mentioned adjustable fence assemblies, having at least one movable fence portion, have frequently been provided.

In order to address the above-discussed problems associated with the provision of a fence assembly having an adjustable clearance gap, a variety of fence-adjusting arrangements have previously been provided. However, many of such prior fence-adjusting arrangements have suffered various disadvantages, including difficulty in maintaining proper alignment between the relatively movable fence portions in wide-gap positions, inconvenience in performing fence adjustment operations, the possibility of inadvertently misplacing a removable fence portion, lack of adequate support for relatively tall or thick workpieces, or other similar disadvantages. Thus, the need has arisen for an adjustable fence for compound miter saws, or other power equipment

requiring fence adjustability, which overcomes these disadvantages, as well as providing improved ease of operation, economy in manufacturing, and other advantages that will become readily apparent to those skilled in the art from the discussion below.

In accordance with the present invention, an improved adjustable workpiece-
5 supporting fence assembly includes a fixed fence portion fixedly interconnected with the base of the device in which it is employed, with the fixed fence portion being disposed on one side of the saw blade, the workpiece cutter, or other such device for performing a working operation on a workpiece. A movable fence portion is selectively and laterally movably interconnected with the frame on the opposite side of the work-performing
10 blade or cutter and is laterally spaced from the fixed fence portion. The base or other portion of the device in one preferred form of the invention includes a fence-supporting portion fixedly disposed on the same opposite side of the blade or cutter, with a laterally-extending slot formed therein. The slot, which preferably has spaced opposite internal walls therein, is adapted to receive a laterally-extending tongue portion of the
15 movable fence, with the tongue being slidably received within the slot for selective adjustable lateral movement of the movable fence toward and away from the fixed fence.

In such preferred embodiments of the present invention, a fixed clamping arrangement is interconnected with the fixed fence-supporting portion for releasably and
20 clampingly urging the tongue on the movable fence portion against a first of the slot's internal walls at any of a number of adjusted positions therein. In addition, a movable clamping arrangement is fixedly interconnected with the movable fence portion for movement therewith and is adapted for releasably and clampingly urging the tongue portion against the same first internal wall of the slot at any number of the adjusted
25 positions. Preferably, the fixed and movable clamping mechanisms are located to provide the greatest possible lateral spacing therebetween, and thus the maximum

alignment and stability, when the movable fence portion is adjusted to a position wherein the lateral spacing or gap between the fixed and movable fence portion is at its minimum.

In order to accomplish the above arrangement, the preferred movable clamping
5 mechanism includes a clamping plate pivotally interconnected with the movable fence
portion and having an abutment portion pivotally movable into and out of clamping
engagement with the second, opposite internal wall portion of the slot. Such pivotal
movement of the clamping plate abutment portion into clamping engagement with the
opposite internal wall portion of the slot causes a reactive force that clampingly urges
10 the tongue portion of the movable fence against the first internal wall portion of the slot.
This arrangement adjustably secures the movable fence portion at any of a number of
selectively adjustable lateral positions relative to the fixed fence portion, regardless of
the size of the fence clearance gap.

In addition, the preferred embodiments of the present invention also include a
15 raised portion of the movable fence, with such raised portion being configured to
interferingly engage with the saw blade assembly and guard, or other such movable
work performing device, without inadvertently damaging the movable fence in order to
alert the operator that the movable fence has not been properly adjusted for the
workpiece cutting or forming operation being attempted. Such raised portion of the
20 movable fence, as well as a similar raised portion of the fixed fence portion, provides
a significant advantage when cutting or working thicker or taller workpieces.

Additional objects, advantages, and features of the present invention will
become apparent from the following description and the appended claims, taken in
conjunction with the accompanying drawings.

Brief Description of the Drawings

In the drawings which illustrate the best mode presently contemplated for carrying out the present invention:

Figure 1 is a front perspective view of an exemplary compound miter saw
5 according to the present invention.

Figure 2 is a front elevational view of the compound miter saw of Figure 1.

Figure 3 is a rear elevational view of the compound miter saw of Figures 1 and
2.

Figure 4 is a left and elevational view of the compound miter saw of Figures 1
10 through 3.

Figure 5 is a schematic plan view diagram of the compound miter saw of Figures
1 through 4, schematically illustrating the position of the saw blade relative to the
workpiece-supporting fence in both a straight cross-cut position and in a miter-cutting
position.

Figure 6 is a schematic diagram, similar to that of Figure 5, but shown in an
15 elevational view and illustrating the position of the saw blade relative to the workpiece
supporting fence when in both a straight cross-cut position and in a bevel-cutting
position.

Figure 6A is a schematic diagram, looking from the rear of the saw, depicting the
20 fully extended and fully retracted positions of a movable portion of the work-supporting
fence.

Figure 7 is a partial cross-sectional view of the work-supporting fence of the
exemplary compound miter saw illustrated in Figures 1 through 4, taken generally along
line 7-7 of Figure 2.

Figure 8 is a cross-sectional view similar to that of Figure 7, but taken generally
25 along line 8-8 of Figure 2.

Figure 9 is a schematic illustration of the preferred interfering relationship of the saw blade guard with the movable portion of the work-supporting fence assembly for alerting the operator that the movable portion of the fence assembly has not been properly adjusted for the operation being performed.

- 5 Figure 10 is a schematic representation illustrating the provision of a movable portion of the fence assembly on each lateral side of an exemplary compound miter saw.

Detailed Description of the Preferred Embodiment

- 10 Referring now to the drawings in which like reference numerals designate like or corresponding parts throughout the several views, Figures 1 through 10 illustrate an exemplary compound miter saw having an adjustable fence assembly according to the present invention, shown merely for purposes of illustration. One skilled in the art will readily recognize from the following description, taken in conjunction with the
- 15 accompanying drawings and claims, that the principles of the invention are equally applicable to compound miter saws or saws of types other than that shown for purposes of illustration in the drawings. Similarly, one skilled in the art will readily recognize that the principles of an adjustable fence according to the invention are also applicable to
- 20 other types of powered, or even unpowered, equipment for performing an operation on a workpiece. Such equipment includes non-compound miter saws, dado saws, spindle shapers or sanders, or other types of powered or unpowered devices that require selective adjustment of the gap or spacing in the fence assembly in order to accommodate different sizes or positions of tooling, or to perform various different workpiece working operations.

- 25 Referring primarily to Figures 1 through 4, an exemplary compound miter saw 10 according to the present invention typically includes a base assembly 12, including

a table assembly 13, which is preferably rotatable in order to accommodate the various cutting modes discussed below. The saw 10 also includes a saw blade 14, at least partially enclosed by a blade guard 16 and driven by a motor 17, and a handle 18, which allows the operator to move the saw blade 14 and the blade guard 16 from a clear position free of a workpiece 11 to a cutting position with the saw blade 14 in cutting engagement with the workpiece 11.

As is conventional in this type of equipment, a fence assembly, indicated generally by reference numeral 20, is interconnected with the base 12 and extends laterally across the table assembly 13, against which the workpiece 11 is fixedly positioned and supported for performing a cutting operation thereon. According to the present invention, the fence assembly 20 includes a fixed fence portion 22 and a movable fence portion 24, with the fixed and movable fence portions 22 and 24, respectively, extending in a mutually aligned lateral direction, with the movable fence portion 24 being laterally spaced away from the fixed fence portion 22. Such lateral spacing or gap between the fixed and movable fence portions 22 and 24, respectively, provides clearance for the saw blade to perform a cutting operation completely through the workpiece 11, regardless of the mode or type of cutting operating being performed. As is discussed in more detail below, the movable fence portion 24 is laterally movable toward and away from the fixed fence portion 22 in order to allow the operator to selectively adjust the clearance gap therebetween and thus accommodate the particular cutting operation being performed.

As is schematically illustrated in Figures 5 and 6, the exemplary compound miter saw 10 depicted in the drawings is capable of a number of different cutting modes or positions. In Figure 5, a schematic plan view generally illustrates the position of the saw blade 14 relative to the frame 12 and the fence assembly 20 when performing straight cross-cut or so-called straight miter-cutting operations. Such straight, square, cross-cut

cutting operation is schematically illustrated by the position of the components of the compound miter saw 10 shown in solid lines in Figure 5, with the movable fence portion 24 having been selectively adjusted to provide the minimum required clearance gap between the fixed and movable fence portions 22 and 24, respectively, with the saw blade being moved into the cutting position along a single, vertical plane, substantially perpendicular to both the front face of the fence assembly 20 and the upper face of the table 13. In contrast, an exemplary miter-cutting operation is also schematically illustrated in phantom lines in Figure 5, in which the plane of movement of the saw blade 14 remains perpendicular to the table 13, but is swung to a preselected miter angle relative to the fence assembly 20, as indicated by reference numeral 14a, and in which the movable fence portion 24 has been preselectively adjusted, as indicated by reference numeral 24a, to increase the clearance gap between the fixed and movable fence portions 22 and 24a, respectively, in order to provide sufficient clearance for the saw blade 14a and associated components in a miter-cutting position.

Similarly, Figure 6 illustrates the saw blade 14 and the movable fence portion 24 in a schematic elevational view, showing the position of the saw blade 14 and the movable fence portion 24 in solid lines for performing the above-described straight, square, cross-cutting operation, with the relative positions of the saw blade 14 and the movable fence portion 24 being shown in phantom lines, as indicated by reference numerals 14b and 24b, respectively, for performing a different type of mitering operation wherein a bevel cut is performed on the workpiece, with the plane of movement of the saw blade 14b being generally perpendicular to the face of the fence assembly 20, but oriented at a bevel or miter angle with respect to the table assembly 13.

Although not specifically illustrated in the drawings, one skilled in the art will readily recognize, from the exemplary positions dramatically illustrated in Figures 5 and 6, that the miter-cutting operation can be combined with the bevel-cutting operation in

order to perform an operation commonly known as a compound cut, wherein the saw blade moves in a plane that is not perpendicular to either the front of the fence assembly 20 or the upper face table assembly 13, thus performing a beveled and mitered, or "compound mitered", cut through the workpiece.

5 Thus, the compound miter saw 10 shown for purposes of illustration in the drawings is capable of at least four general types of cutting operations, to which reference is made herein as cross-cutting, miter-cutting, bevel-cutting and compound cutting operations. Such typically infinite compound adjustability of the relative position and orientation of the saw blade relative to both the table assembly 13 and the fence
10 assembly 20 is accomplished by way of a compound pivot mechanism 34, illustrated generally in Figures 3 and 4. Such compound pivot mechanism 34 can be any of a number of well-known compound mechanisms, which also allow the saw blade 14 and the blade guard 16 to be pivotally moved from a raised, clear position to a lowered or cutting position, once the saw is adjusted to the desired operating mode, in order to
15 perform a cutting operation on the workpiece 11.

 In order to accommodate the widely divergent positions and orientations of the saw blade 14 relative to the fence assembly 20, and in order to allow a complete cut-through operation to be performed on the workpiece 11, the fence assembly 20 must be capable of selective adjustment in order to preadjust the lateral clearance gap or
20 spacing between the fixed and movable fence portions 22 and 24, respectively, in order to provide the required clearance, while still providing adequate support for the workpiece 11. In accordance with a preferred form of the present invention, such fence assembly adjustability is accomplished in part by the provision of a fence-supporting portion 26 of the base 12. The fence-supporting portion 26 can be a separate
25 component, fixedly secured to the base 12, or it can be an integral portion of the fixed fence 22, with an interconnecting portion 27 extending laterally across the clearance

gap, behind the fixed and movable fences to the opposite side of the saw blade to
interconnect with the fixed fence 22, as shown in Figures 1, 3 and 5, without interfering
with the complete cutting of the workpiece 11. In either arrangement, the fence-
supporting portion 26 is fixedly secured to, or interconnected with, the base 12 and is
mutually aligned in a laterally-extending direction with the fixed fence portion 22.

As perhaps best seen in Figures 7 and 8, the fence-supporting portion 26
preferably includes a slot 46 defined by a first or front internal wall 48 spaced away from
a second or rear internal wall 50, in order to form a space therebetween extending
laterally along the movable fence side of the saw blade 14. The movable fence 24
preferably includes an upper portion 40, an intermediate portion 42, a tongue portion 44
slidably received within the slot 46, and a lower face of the intermediate portion 42
slidably engaging the fence-supporting portion 26. The front faces of the fence-
supporting portion 26 and the movable fence portion 24 are vertically aligned and flush
with one another, as is illustrated in Figures 7 and 8.

In order to secure the movable fence portion 24 in a preselected, adjusted
position for purposes of performing a desired cutting operation, two clamping
arrangements are preferably provided for releasably fixing the position of the movable
fence portion 24 relative to the fence-supporting portion 26, with their front faces flush
and vertically aligned. The fixed clamping mechanism preferably includes a clamping
screw 54 threadably engaging and movable within a threaded opening 56 in the fixed
fence-supporting portion 26. The clamping screw is selectively rotatable by way of a
manual knob 55 in order to threadably advance the clamping screw 54 toward the
tongue 44 and to clampingly and forcibly urge the tongue 44 against the front internal
wall 48 of the slot 46, as shown in Figure 7.

A movable clamping mechanism is also preferably provided, as is illustrated in
Figure 8, and a recessed portion 60 of the movable fence 24 is provided to

accommodate a clamping plate 62 disposed on the rear side of the movable fence 24. The clamping plate 62 preferably includes an abutment portion 64, extending into the slot 46, which is selectively pivotally movable into abutment with the rear internal wall 50 of the slot 46, by way of the pivotal engagement of the clamping plate 62 about a fulcrum edge 68 of a shoulder portion 66 formed on the fence-supporting portion 26. The abutment portion 64 of the clamping plate 62 is held in its abutting relationship with the rear internal wall 50 of the slot 46 preferably by way of a threaded rod member 72 fixed on the movable fence portion 24, and extending through an opening 71 in the clamping plate 62 to threadably engage a locking nut 74, preferably having a knob 75 on the locking nut 74.

Thus, by threadably tightening the locking nut 74, the operator forcibly urges the locking portion 70 of the clamping plate 62 toward the movable fence portion 24, which results in the abutment portion 64 of the clamping plate 62 being pivoted rearwardly about the fulcrum edge 68 in order to abuttingly and forcibly engage the rear internal wall 50 of the slot 46. As a result of this forcible abutting engagement of the abutment portion 64 against the rear internal wall 50 of the slot 46, a reactive force is exerted on the movable fence portion 24 in a frontward direction to forcibly and clampingly urge the tongue 44 against the forward internal wall 48 of the slot 46, thus releasably and securely clamping the movable fence 24 in its preselected lateral position relative to the fixed fence 22.

This arrangement allows for example, the lateral distance between the above-discussed fixed and movable clamping arrangements to be at its maximum when the movable fence 24 is adjusted to provide the minimum clearance gap, such as would be desired in straight cross-cutting operations, such as that shown in Figure 1. This gives the greatest amount of uniform clamping distribution for releasably securing the movable fence 24 in this position, which in turn provides the maximum amount of

support for the workpiece 11. However, the fence assembly of the present invention allows both the clamping arrangements to be used even when the movable fence 24 must be positioned laterally farther away from the fixed fence portion 22 in order to accommodate other cutting modes. This is because the above-described clamping plate arrangement is interconnected and movable with the movable fence 24. It can readily be seen that if both clamping arrangements had been fixed relative to the fence-supporting portion 26, many outwardly adjusted positions of the movable fence 24 would result in only one of the clamping arrangements being usable to secure the movable fence 24 in its adjusted position, thus increasing the possibility of misalignment either vertically or laterally with the fixed fence 22 and lessening the work-supporting capabilities of the fence assembly 20. The fully retracted position of the movable fence 24 is shown in solid lines in Figure 6, with the fully extended position (indicated by reference numeral 24c) is shown in phantom lines.

In order to minimize the possibility of inadvertent removal of the movable fence 24 from the table 13 and the frame 12 during position adjustments, the front face of the tongue 44 is preferably provided with an elongated antiremoval groove or slot 80 extending laterally therealong, as shown in Figures 7 and 9. A complementary projection 82 is fixed to the fence-supporting portion 26 and protrudes into the slot 46 to be received in the antiremoval groove 80. As perhaps best seen in Figure 9, the lateral length of the groove 80 is sufficient to allow full adjusting movement of the movable fence 24 but insufficient to allow inadvertent removal of the movable fence 24. In addition, the clamping plate 62 also interferes with removal of the movable fence 24 unless the clamping plate 62 is first loosened.

When it is desired to intentionally remove the movable fence 24 for repair, replacement or cleaning, however, the fixed clamping screw 54 (see Figure 7) can be

sufficiently loosened, and the clamping plate 62 (see Figure 8) is loosened, allowing the movable fence 24 to be removed.

Since the movable fence 24 must be movably adjusted in order to allow the operator to perform various cutting operations of the compound miter saw 10, damage to the movable fence 24 could result if the operator fails to properly adjust its lateral position. In order to minimize such damage, which could result from the saw blade 14 contacting a misadjusted movable fence 24, a raised portion 32 is formed generally at the saw blade end of the movable fence 24, with the edge of such raised portion 32 sloping generally downwardly toward the saw blade 14 and the table assembly 13. Such raised portion 32 is sized and configured, as is schematically illustrated in Figure 9, so that it interferingly engages the blade guard 16 if the blade guard 16 and the saw blade 14 are moved from their clear position to their cutting position when in substantially all of the cutting set-up modes or configurations of which the compound miter saw 10 is capable.

In addition, as can be seen in Figures 1 through 3, the raised portion 32 of the movable fence 24, along with one or more raised portions 28 and 30 on the fixed fence 22, provide an increased vertical workpiece-supporting face or surface, which allows the operator to properly support a relatively tall or thick workpiece. Such increased-height workpiece-supporting capability is especially advantageous when cutting thick stock, crown moldings, or other such relatively tall workpiece shapes, orientations, or configurations.

Figure 10 schematically illustrates the provision of a laterally adjustable movable fence portion on each lateral side of an exemplary compound miter saw according to the invention. Such dual movable fence provision accommodates movement to selective miter, bevel, and compound cutting operations on either lateral side of the compound miter saw. Similarly, such an arrangement is advantageous in other work-

performing devices where work operations can be performed on either lateral side of the device, as well as being capable of accommodating large working tools, such as large shaper cutters, for example.

In such alternate arrangement, as schematically illustrated in Figure 10, each lateral side of an exemplary compound miter saw 110 includes a fence-supporting portion 126 for slidably supporting a movable fence portion 124, with these components, as well as their respective fixed and movable clamping arrangements, being essentially the same in configuration and function as those discussed above, but preferably arranged symmetrically, in a mirror-image configuration on opposite sides of the saw blade 114.

Accordingly, the exemplary compound miter saw 10 constructed in accordance with the principles of the present invention provides for increased ease of fence clearance gap adjustability, it facilitates proper fence alignment and securement, both vertically and laterally, when performing any of the widely divergent cutting operations for which the compound miter saw 10 is designed, it provides increased protection against inadvertent damage due to a nonadjusted or misadjusted fence, and it provides greatly improved workpiece-supporting capabilities for relatively thick or tall workpieces.

The foregoing discussion discloses and describes merely exemplary embodiments of the present invention for purposes of illustration only. One skilled in the art will readily recognize from such discussion, and from the accompanying drawings and claims, that various changes, modifications, and variations may be made therein without departing from the spirit and scope of the invention as defined in the following claims.

What is claimed is:

1. A miter saw comprising:
 - a base;
 - a table rotatably attached to the base;
 - a saw assembly pivotably connected to the table, said saw assembly
 - 5 comprising a rotatable cutting tool, a motor driving the cutting tool, and a housing
 - covering the motor, the cutting tool being pivotably movable about a chopping axis in
 - order to move the cutting tool towards the table for cutting a workpiece, the cutting tool
 - being movable between a first position substantially perpendicular to the table, a second
 - 10 position inclined in a first direction from the first position, and a third position inclined in
 - a second direction from the first position, the second direction being opposite to the first
 - direction;
 - a first fence assembly disposed on one side of the base, the first fence
 - assembly comprising a first fixed fence associated with the base, and a first movable
 - fence being interconnected with the first fixed fence; and
 - 15 a second fence assembly disposed on the other side of the base, the
 - second fence assembly comprising a second fixed fence associated with the base, and
 - a second movable fence being interconnected with the second fixed fence.
2. The miter saw of Claim 1, further comprising a handle connected to the
- housing, the handle being substantially horizontal.
3. The miter saw of Claim 1, wherein the cutting tool defines a plane which
- intersects the motor.

4. The miter saw of Claim 1, wherein the chopping axis is above the first fence assembly.

5. The miter saw of Claim 1, wherein the saw assembly is movable along a vertical plane substantially perpendicular to the table.

6. The miter saw of Claim 1, further comprising a rail supporting the saw assembly, and a housing pivotably connected to the table and supporting the rail.

7. The miter saw of Claim 6, wherein the housing slidably supports the rail.

8. The miter saw of Claim 1, further comprising a first gap-filling flap pivotably secured to the first movable fence.

9. The miter saw of Claim 8, further comprising a second gap-filling flap pivotably secured to the second movable fence.

10. The miter saw of Claim 1, further comprising first anti-removal means for inhibiting removal of the first movable fence from the first fixed fence.

11. The miter saw of Claim 10, further comprising second anti-removal means for inhibiting removal of the second movable fence from the second fixed fence.

12. The miter saw of Claim 1, further comprising first means for indicating a relative position of the first movable fence in relation to the first fixed fence.

13. The miter saw of Claim 12, further comprising second means for indicating a relative position of the second movable fence in relation to the second fixed fence.

14. The miter saw of Claim 1, further comprising a first member for releasably holding the first movable fence in a predetermined position in relation to the first fixed fence.

15. The miter saw of Claim 14, further comprising a second member for releasably holding the second movable fence in a predetermined position in relation to the second fixed fence.

16. The miter saw of Claim 1, wherein the first movable fence includes a first raised portion disposed at one end of the first movable fence, said raised portion coacting with the first fixed fence to align respective front faces of the first fixed fence and the first movable fence.

17. The miter saw of Claim 16, wherein the second movable fence includes a second raised portion disposed at one end of the second movable fence, said raised portion coacting with the second fixed fence to align respective front faces of the second fixed fence and the second movable fence.

18. The miter saw of Claim 1, further comprising a first cam rod disposed between the first fixed fence and the first movable fence, the first cam rod being operable to clamp the first movable fence against the first fixed fence upon rotation of the first cam rod.

19. The miter saw of Claim 18, further comprising a second cam rod disposed between the second fixed fence and the second movable fence, the second cam rod being operable to clamp the second movable fence against the second fixed fence upon rotation of the second cam rod.

20. The miter saw of Claim 1, further comprising a first fixed clamping arrangement operable to clamp the first movable fence to the first fixed fence due to the movement of a single clamping member such that respective faces of the first fixed fence and the first movable fence are maintained in alignment.

21. The miter saw of Claim 20, further comprising a second fixed clamping arrangement operable to clamp the second movable fence to the second fixed fence due to the movement of a single clamping member such that respective faces of the second fixed fence and the second movable fence are maintained in alignment.

Abstract of the Disclosure

An improved adjustable workpiece supporting fence assembly for a compound miter saw, or other work performing device, includes a first fixed fence portion fixedly interconnected with the base of the device on one side of the saw blade and a first
5 movable fence is movably interconnected to the first fixed fence portion. A second fixed fence portion is fixedly interconnected with the base of the device on the other side of the saw blade and a second movable fence is movably interconnected to the second fixed fence.

Fig. 1.

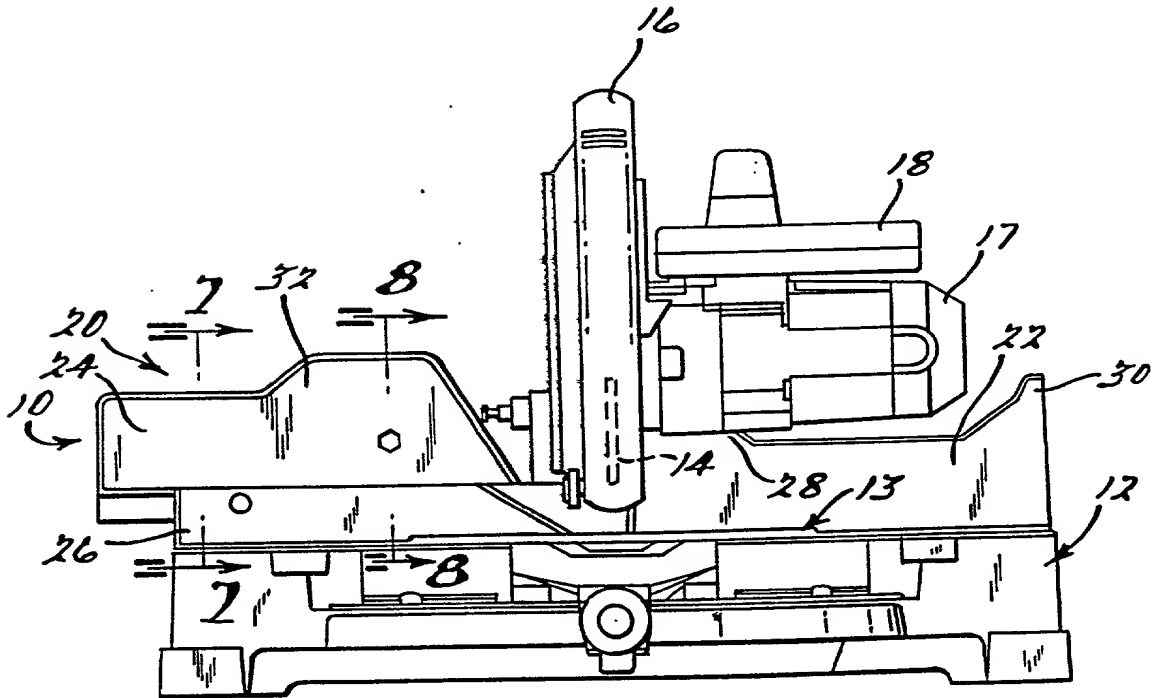
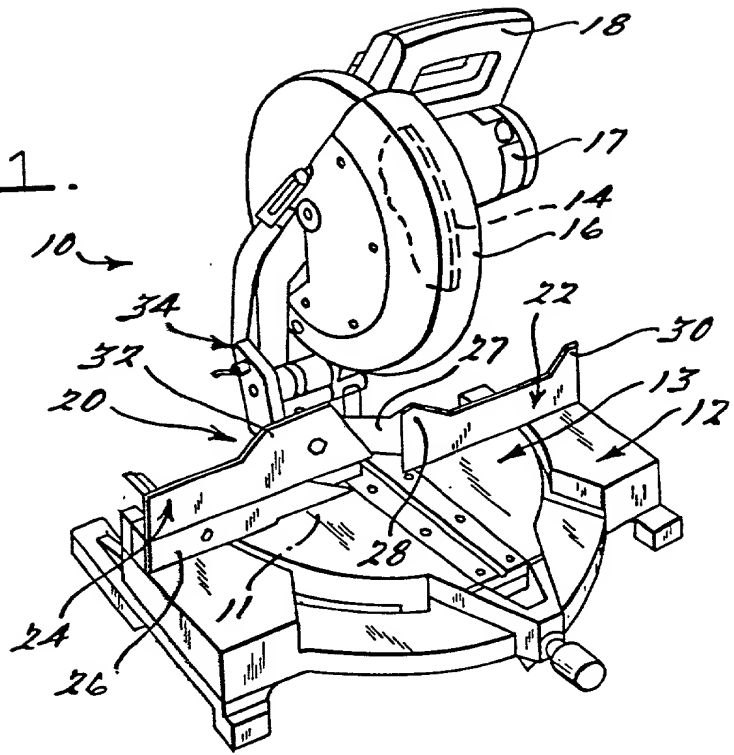


Fig. 2.

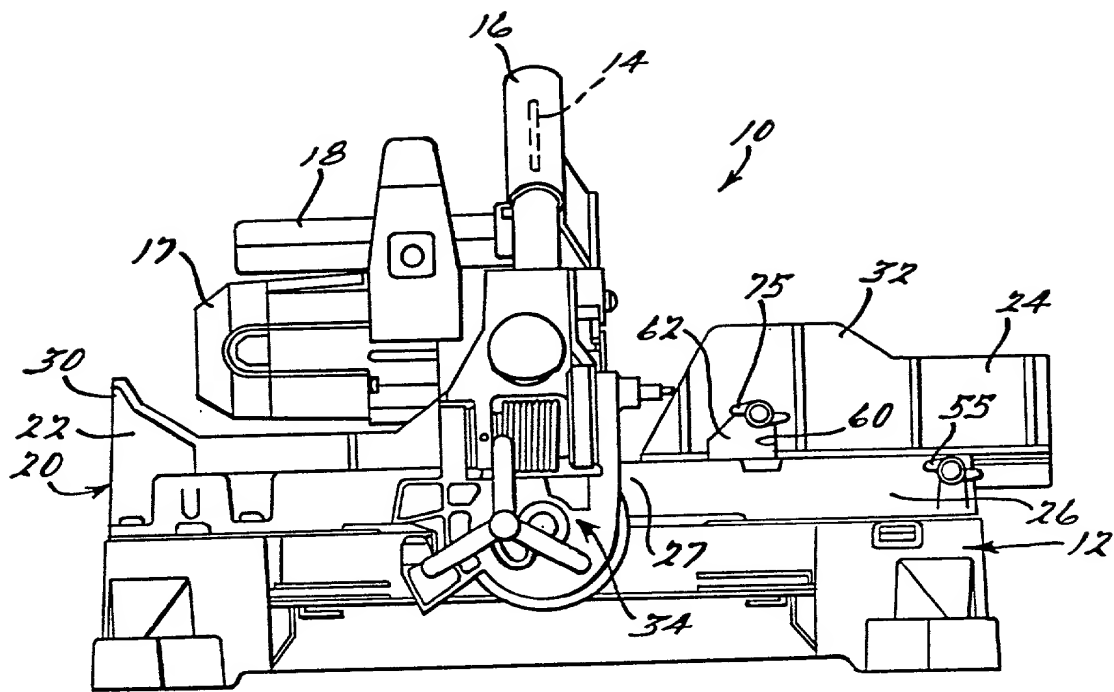


FIG. 3.

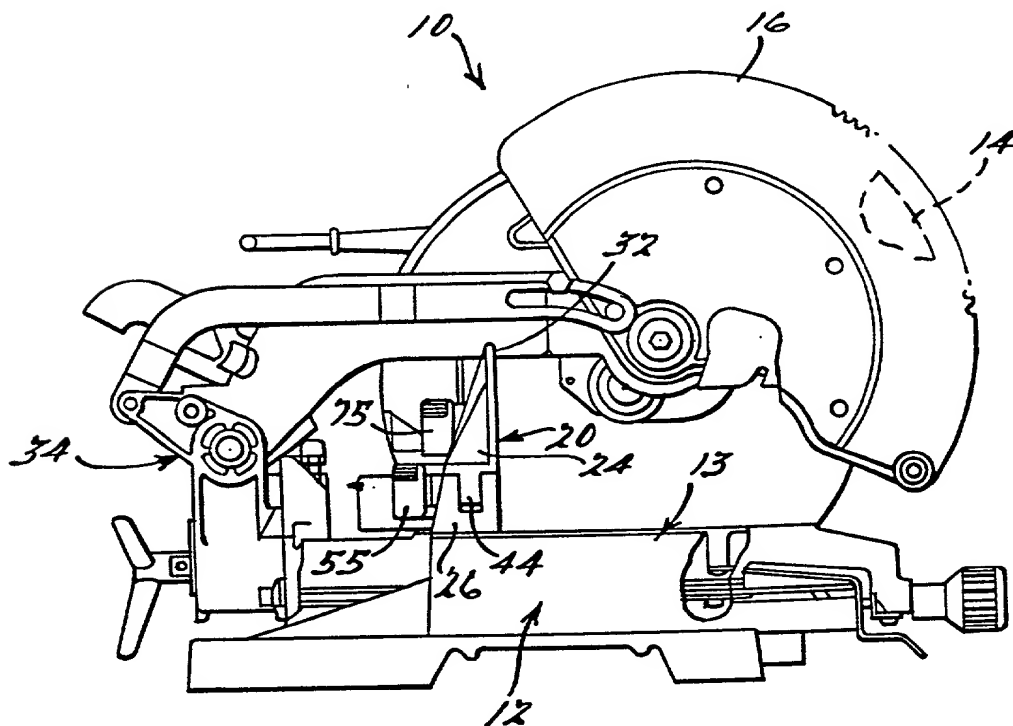


FIG. 4.

FIG. 5.

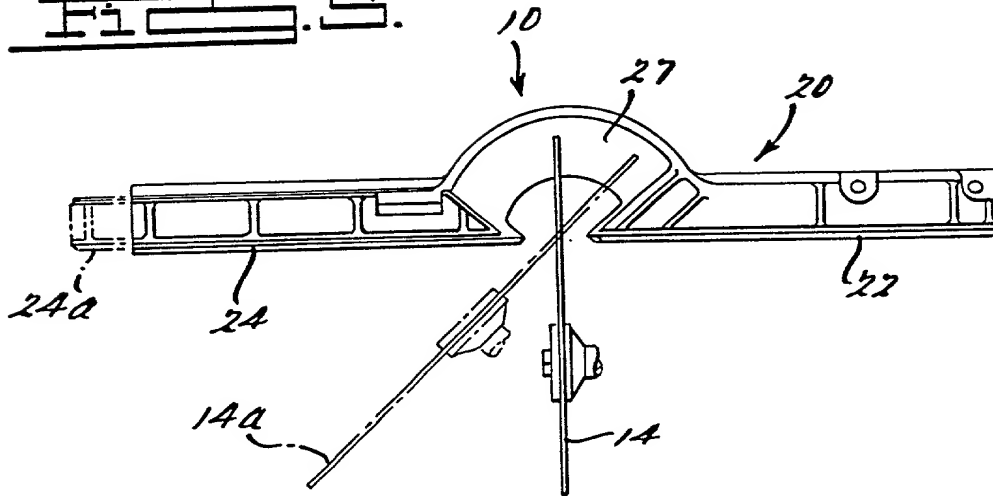


FIG. 6.

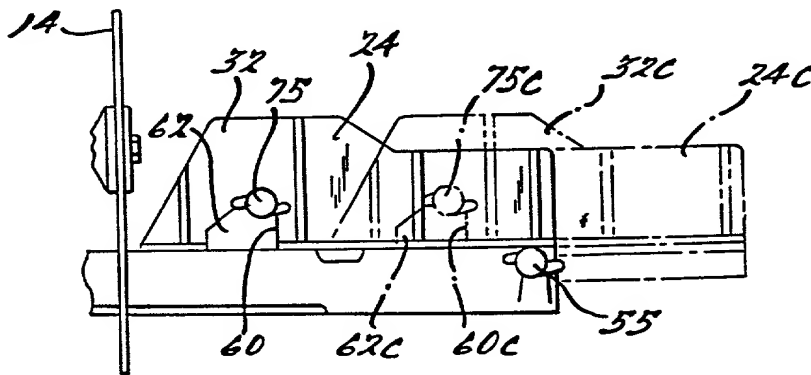
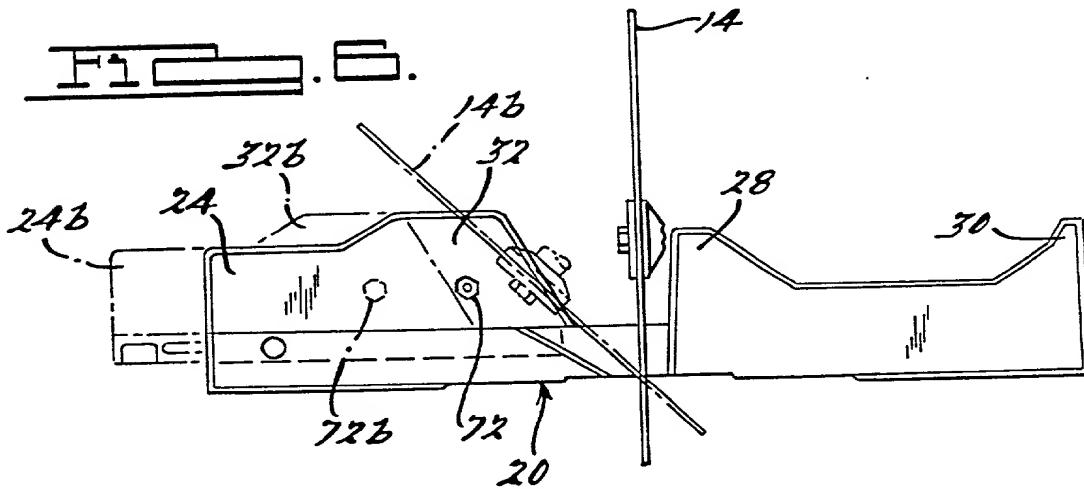


FIG. 6A.

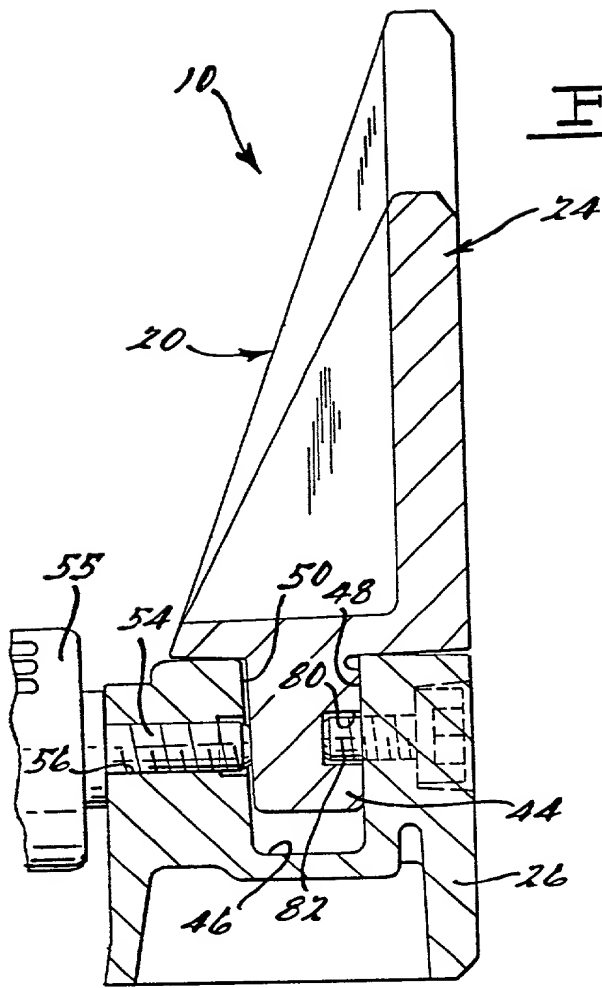


FIG. 7.

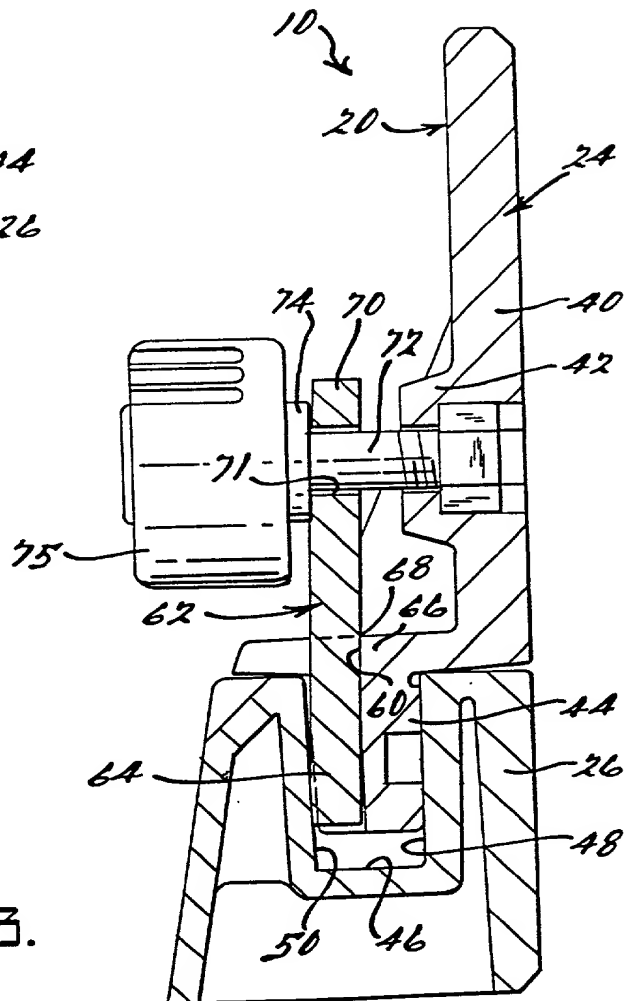


FIG. 8.

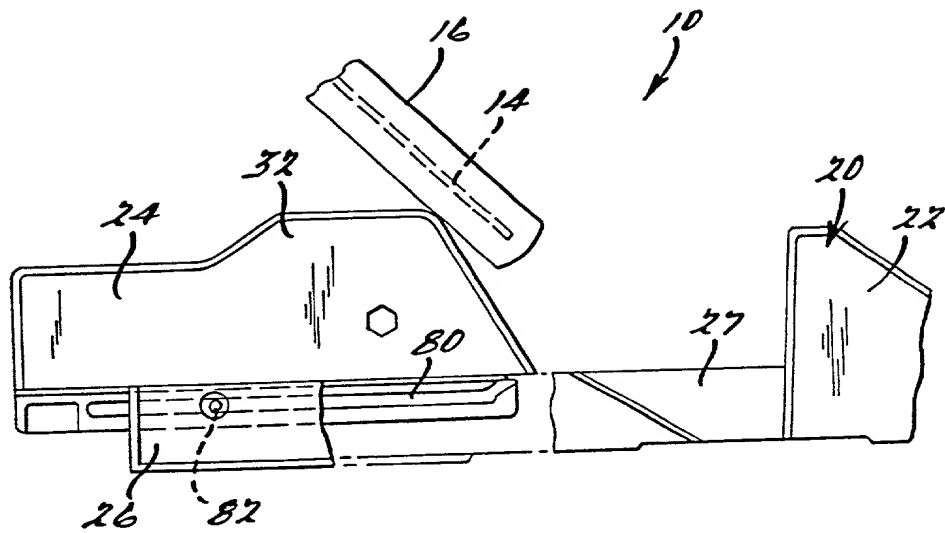


FIG. 9.

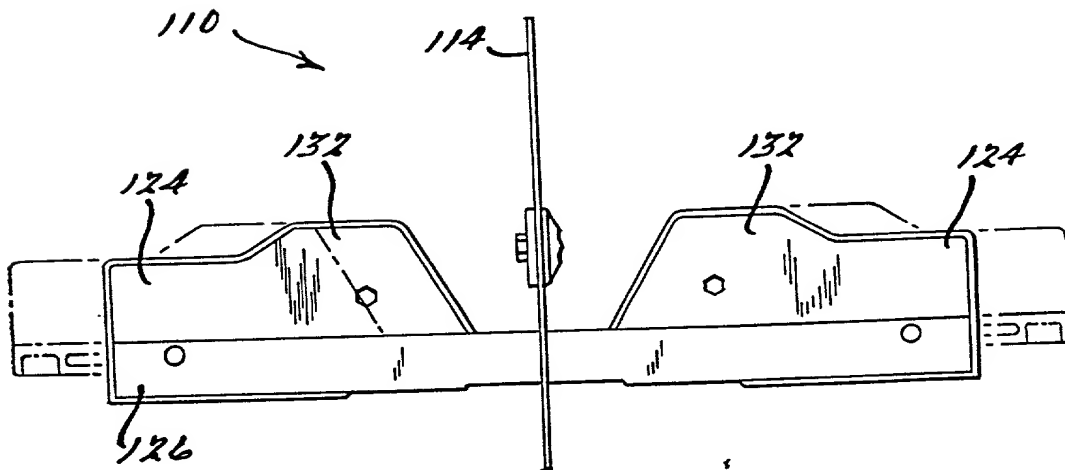


FIG. 10.

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As a below named inventor, I hereby declare that: my residence post office address and citizenship are as stated next to my name; that I verily believe that I am the original, first and sole inventor (if only one inventor is named below) or a joint inventor (if plural inventors are named below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: *

"ADJUSTABLE FENCE FOR COMPOUND MITER SAW"

the specification of which is attached hereto unless one of the following boxes below is checked:

- ☒ The Specification was filed on October 9, 1991 and was assigned
Serial No. 07/774,022 and was amended on _____
☐ was filed as PCT international application number _____ on _____
and was amended under PCT Article 19 on _____
(if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I do not know and do not believe the same was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof, or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to this application, and that no application for patent or inventor's certificate on this invention has been filed in any country foreign to the United States of America prior to this application by me or my legal representatives or assigns, except as follows:

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below:

Prior Foreign Application(s)

Priority Claimed

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Information
(If appropriate)

(Number)	(Country)	(Month/Day/Year Filed)	<input type="checkbox"/> Yes	<input type="checkbox"/> No
(Number)	(Country)	(Month/Day/Year Filed)	<input type="checkbox"/> Yes	<input type="checkbox"/> No
(Number)	(Country)	(Month/Day/Year Filed)	<input type="checkbox"/> Yes	<input type="checkbox"/> No
(Number)	(Country)	(Month/Day/Year Filed)	<input type="checkbox"/> Yes	<input type="checkbox"/> No
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All Foreign Applications, if any, for any Patent or Inventor's Certificate Filed More Than 12 Months Prior To The Filing Date of This Application:

Country	Application No.	Date of Filing (Month/Day/Year)
_____	_____	_____
_____	_____	_____

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.)	(Filing Date)	(Status — patented, pending, abandoned)
_____	_____	_____
(Application Serial No.)	(Filing Date)	(Status — patented, pending, abandoned)
_____	_____	_____

I hereby appoint the following attorneys to prosecute this application and/or an international application based on this application and to transact all business in the Patent and Trademark Office connected therewith and in connection with the resulting patent based on instructions received from the entity who first sent the application papers to the attorneys identified below, unless the inventor(s) or assignee provides said attorneys with a written notice to the contrary:

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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 Insert Name of Inventor
 Insert Date This
 Document is Signed
 Insert Residence
 Insert Citizenship

Insert Post Office
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 Inventor, if any:
 see above

Full Name of Third
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Full Name of Fourth
 Inventor, if any:
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Full Name of Fifth
 Inventor, if any:
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 — date this document is
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